

CLAIMS

1. A four branch differential transmission system comprising a first shaft
5 (10) and a second shaft (12), which constitute the input and output shafts, a
third shaft (42) connected to a first variator (44, 46) arranged to increase or
decrease its speed and a fourth shaft (48) connected to a second variator (50,
52) arranged to increase or decrease its speed, the four shafts (10, 12, 42, 48)
being connected together by a spur gear compound epicyclic gearset including a
10 plurality of toothed gearwheels, characterised in that the compound epicyclic
gearset comprises first and second epicyclic gearsets, the first epicyclic gearset
being of positive type and comprising a first sun wheel (40) and a second sun
wheel (28) in mesh with a respective set of first and second planet wheels (21;
26), each first planet wheel (21) being connected to rotate with a respective
15 second planet wheel (26) about a respective common planet shaft (24), the
planet shafts (24) being connected to a common planet carrier (22), the second
epicyclic gearset being of negative type and comprising the first sun wheel (40)
and a third sun wheel (38), the third sun wheel being in mesh with a set of third
planet wheels (39), each of which is connected to rotate with a respective first
20 and second planet wheel about a respective planet shaft (24), the first and third
planet wheels (21; 39) or the first and second planet wheels (21; 26) of each
connected set of planet wheels being of different diameter and being connected
together to constitute a stepped composite planet wheel.
- 25 2. A transmission system as claimed in Claim 1 in which the set of third
planet wheels (38) is in mesh with a set of fourth planet wheels (32) mounted to
rotate about respective planet shafts (34) connected to the common carrier (22),

each fourth planet wheel (32) being in mesh with a respective third planet wheel (39), whereby the third sun wheel (38) is in indirect mesh with the third planet wheels (39) and rotates in the same direction as the third planet wheels.

5 3. A transmission system as claimed in Claim 1 or 2 in which the common carrier (22) is connected to one of the input and output shafts (10, 12).

10 4. A transmission system as claimed in any one of the preceding claims in which the common carrier (22) at least partially surrounds the first and second epicyclic gearsets.

15 5. A transmission system as claimed in any one of Claims 1 to 3 in which the first sun wheel (40) is connected to one of the input and output shafts (10, 12).

6. A transmission system as claimed in any one of the preceding claims in which the input and output shafts (10, 12) are coaxial.

20 7. A transmission system as claimed in any one of the preceding claims in which the variators comprise electric motor/generators (44, 46; 50, 52), preferably arranged coaxially.

25 8. A transmission system as claimed in Claim 7 in which the stator connections of the two motor/generators (44, 46; 50, 52) are connected together via one or more controllers (51, 53) which may be selectively operated to vary the electrical power transmitted between the two motor/generators and thus to vary the transmission ratio of the transmission system.

9. A transmission system as claimed in any one of the preceding claims including an outer casing, which is divided into a dry space (54), in which the variators (44, 46; 50, 52) are accommodated, and an oil lubricated space (56), in
5 which the compound epicyclic gearset is accommodated.